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EXAMINER

PATEL, ASHOK

ART UNIT PAPER NUMBER

2879

DATE MAILED: 04/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/759,746

Applicant(s)

CATHEY, DAVID A.

Examiner

Ashok Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 January 2005.
2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 23 and 25-30 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 23 and 25-30 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

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1. Applicant's arguments with respect to claims 23-30 have been considered but are moot in view of the new ground(s) of rejection. Obviousness type rejection is withdrawn in view of applicant's submission of acceptable terminal disclaimer.

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 23-30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 23 recites the limitation that "the impurity within the protuberance having a concentration increases concurrently with a distance from the apex". The original disclosure does not provide a support for the now claimed impurity concentration within the protuberance increasing concurrently with a distance from the apex. The original disclosure does provide a support

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for the impurity concentration within the protuberance decreasing concurrently with a distance from the apex.

As to claim 25, the original disclosure does not provide a support for the now claimed limitation "a contaminated apex having..... ..an increasingly contaminated body, the concentration of the impurity increasing from the contaminated apex" At lines 10-13.

The original disclosure does provide a support for the a contaminated apex having..... ..an decreasingly contaminated body, the concentration of the impurity decreasing from the contaminated apex."

As to claim 27, the original disclosure does not provide a support for the now claimed limitation "an apex having an etch-resistible quality that decreases with distance from the apex at lines 7-8.

The original disclosure does provide a support for the apex having an etch-resistible quality that increases with distance from the apex.

Claims 26 and 28-30 are necessarily rejected since they depend upon claims 23, 25 and 28.

4. Claims 25-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point

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out and distinctly claim the subject matter which applicant regards as the invention.

Claim 25 states at lines 10-11 that "a contaminated apex having an impurity concentration substantially the same as a portion of the single-layered substrate at the upper surface thereof". Claim 25 further states at lines 12-13 "the concentration of the impurity increasing from the contaminated apex". These two limitations are contradicting with each other. It remains unclear whether the apex of the emitter has substantially the same or higher dopant concentration than that of the portion of the substrate.

This contradiction is due to the fact that the limitation/text "an impurity concentration substantially the same as a portion of the single-layered substrate at the upper surface thereof" at lines 10-11 is not deleted in view of deletion of the limitation/text "having an upper surface, the single layered substrate having an impurity concentration greatest at the upper surface while decreasing with a distance from the upper surface" at lines 4-6.

For the purpose of examination, claim 25 is interpreted to mean that the apex of the micro-cathode (emitter) has an increasingly contaminated body and the concentration of the impurity decreases with a distance from the contaminated apex.

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Claim 26 is necessarily rejected since it depends upon claim 25.

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 23 and 25-30 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bol (USPN 5,269,866, of record).

As to claim 23, the Bol reference discloses a pixel (Figs. 6, 12, 22) including: a single layered polysilicon (semiconductive) substrate (element 12), the substrate includes at least one protuberance (22, Figure 22) having an apex (26), an impurity offset from the apex of the protuberance, the impurity having a concentration decreasing concurrently with a distance from the apex Column 3, Line 67- Column 4, Line 1).

The single layered substrate is used to create an emitter tip with a decreasing dopant gradient (Figure 12 and 6) where the greatest concentration of dopant is at the apex of the emitter.

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The Examiner interprets the pixel within Bol's device including element 12 per se as a single-layered substrate. The Examiner does not include element 10 as part of the pixel device.

The Examiner also takes an alternative position with respect to 35 U.S.C. 103(a) as being obvious over Bol as follows.

Bol differs from applicant's claimed pixel device in that Bol's device includes the substrate as a separate element (10), which is attached to the element 12. However, removing the additional element (number 10) from the Bol's device would have been obvious to one of ordinary skill in the art, since its presence is not necessary when element 12 includes desired strength to support associated elements of the device.

Therefore, it would have been obvious to one of ordinary skill in the art to provide Bol's device and modify so as to enhance the strength of the element 12 and remove the additional element 10 for supporting associated elements of the device.

Further, it has been held that the omission of an element and its function is an obvious expedient if the remaining elements perform the same function as before. In re Karlson, 136 USPQ 184 (CCPA). Also note Ex {arte Raine, 168 USPQ 375 (bd. App. 1969); omission of a reference element whose function is not needed would be obvious to one of ordinary skill in the art.

As to claim 25, the Bol's device is a field emission device (Col. 1, lines 1-2) including a single-layered substrate

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(element 12) as mentioned in the rejection of claim 23, a (bottom) portion of which is an uncontaminated (as shown by concentration profile 14, which shows maximum at the top and none at the bottom of the element 12), the apex of the protuberance is a micro-cathode, as claimed by applicant. The apex is contaminated by way of doping with impurities.

Again, alternatively, it would have been obvious to one of ordinary skill in the art to provide Bol's device and modify so as to remove the additional element 10, since its presence is not necessary in view of sufficient thickness and strength of the element 12.

As to claim 26, as clearly shown in Figures 6, 7, 12 etc., the micro-cathode is integral with the substrate (12).

As to claim 27, Bol discloses the apex including an etch-resistible quality that increases with the distance from the apex (col. 3, lines 37 col. 4, line 6). The higher concentration of the impurity (dopant) speeds up etching process (col. 3, lines 45-46), that is to say, the lower concentration the of impurity (dopant) increases etching resistivity.

Again, alternatively, it would have been obvious to one of ordinary skill in the art to provide Bol's device and modify so as to remove the additional element 10, since its presence is not necessary in view of sufficient thickness and strength of the element 12.

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As to claim 28, Bol discloses that the emitter has an oxidizable quality that increases with elevation from the base (Column 4, Lines 4-7).

As to claim 29, Bol discloses that the etch-resistible quality increases as the doping concentration decreases (col. 4, lines 44-46). Therefore, a portion of the substrate (12) under the emitter electrode (protuberance 12) has the same etch-resistible quality as the base of the emitter electrode.

As to claim 30, Bol discloses that the oxidizable quality is directly related to the amount of dopant concentration and will decrease as the amount of doping concentration and will decrease as the amount of doping decreases (column 4, lines 4-7). Therefore, a portion of the emitter tip has the same oxidizable quality as the base of the emitter electrode.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action

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is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37. CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ashok Patel whose telephone number is 571-272-2456. The examiner can normally be reached on Monday-Thursday.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Ashok Patel
Primary Examiner
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